

Process Modeling

Moving from Yesterday, into Today and toward Tomorrow

Robert E. Heard, Bechtel BWXT Idaho - INEEL
Jack R. Dixon, BWXT Y-12

Introduction

- Purpose(s) for modeling old processes
- Model development process
- Lessons learned

Why Model Old Processes

- The DOE mission to maintain the nuclear weapon stockpile
 - Restarting old processes out of operations for many years
 - Costs associated with restart of the process
 - Complete process knowledge/throughput is necessary

Some Issues to Overcome

- Classified design specifications
 - Implicit process procedures from designs
 - Final product/part meeting design specifications
- Handling Need-to-know issues
- New ES&H regulations

Steps Used to Develop Models

- Process owner interviews
 - Develop overall process flow diagrams
 - Detail old process flow (prior to shutdown)
- Individual process operators' interviews
 - Detailing each sequential process step
- Support organization(s) interviews
- Management review
 - Demonstrating value of modeling

Steps Used to Develop Models (Cont'd)

- Detailed process flow diagram(s) of original process developed
- In-depth review of flow diagrams to identify needed process changes (Regulations)
 - Equipment operation
 - Material handling
- Develop detailed process flow diagrams for current operations

Steps Used to Develop Models (Cont'd)

- Develop initial model for the process based on current operational flow diagram
- Populate model with process parameters (Database)
 - Time
 - Resources (people, material, auxiliary systems)
- Demonstrate preliminary model - verify and validate model operation

Steps Used to Develop Models (Cont'd)

- Refine the preliminary model
 - Process owner, operator, support organizations, and management review
- Develop and release first revision of the model
 - Let the customer use the model
 - Adjust/enhance model to meet customer needs.

New Technology Insertion

- Use model to evaluate overall system impact of introducing new technologies
 - Footprint (space requirements)
 - Utility needs
 - Training
- Overall process improvement or just new technology (return on investment)

Lessons Learned

- Involve everyone
 - Group acceptance of the utility of the tool
- Modeling begins only after the process flow diagramming is completed
- Classified information adds additional effort
- Design specifications vs. procedures

Lessons Learned (Cont'd)

- Support equipment/utilities changed over time
 - Use diverted for other operational needs
- New ES&H requirements and their impacts on production
- Availability of source material